

ANNUAL REPORT

1962

TOWN OF CONISTON



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367	Coniston sewage treatment plant.
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ANNUAL REPORT

ON

TOWN OF CONISTON

SEWAGE TREATMENT PLANT

OWRC PROJECT - 58-S-8



Environment Ontario
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CONISTON SEWAGE TREATMENT PLANT

OPERATED FOR

THE TOWN OF CONISTON

BY

THE ONTARIO WATER RESOURCES COMMISSION

Mr. A. M. Snider	-	Chairman
Dr. A. E. Berry	-	General Manager
Mr. D. S. Caverly	-	Assistant General Manager, and Director of Plant Operations
Mr. B. C. Palmer	-	Assistant Director, Division of Plant Operations
Mr. P. J. Osmond	-	Project Engineer, Division of Plant Operations

Prepared by the
Division of Plant Operations.

CONISTON ANNUAL REPORT - 1962

In June, 1957 the Ontario Water Resources Commission entered into an agreement with the Town of Coniston for the construction of a sewage disposal system. The system, designed by E. M. Powell & Associates, Consulting Engineers, consisted of five sewage pumping stations, sanitary sewers and an activated sludge sewage treatment plant. Under the supervision of the Consulting Engineers, Carrington Construction Company Limited completed the project at a total estimated cost of \$413,370.94.

On December 5th, 1958 the plant was put into temporary operation and on April 30th, 1959 came into full operation.

PROJECT DESCRIPTION

Collection System and Plant

The sewage of the municipality is collected by a system of sanitary sewers, ejector stations and finally an underground lift station which pumps the sewage to the influent works of the plant, from which it flows through the plant by gravity.

The sewer system is made up of :-

- 2995 feet of 10" \emptyset sewer pipe,
- 21,193 feet of 8" \emptyset sewer pipe,
- 8,758 feet of 6" \emptyset sewer pipe,
- 6,157 feet of 4" \emptyset sewer pipe,
- 296 - 6" double service connections,
- 76 - 4" single service connections,
- 282 feet of 8" \emptyset forcemain,

Sewer System Cont'd ...

3,862 feet of 6" Ø forcemain,
106 manholes.

The sewers are maintained by the Town's Works Department, coupled with periodic manhole inspections by the sewage plant operator.

All of the lift stations are automatically controlled, cutting on and off as the level in the wet well rises and falls.

Lift station # 1, located at the northeast corner of Mitchell and William Streets, consists of an underground wet well and dry well with one 60 gallons/minute capacity pneumatic ejector. The ejector is operated by a $2\frac{1}{2}$ HP motor and compressor unit.

Lift stations # 2, 3 and 4, located at the southwest corner of Nickel and William Streets, the southwest corner of Horace Avenue and Caruso Street, and the southwest corner of Concession Street and Forth Avenue, respectively, are similar to Station # 1 only two 60 gallon/minute pneumatic ejectors are included instead of one.

Station # 5, located just east of the sewage plant consists of a dry well and wet well with two vertical drive centrifugal pumps which handle all of the incoming sewage to the plant.

The plant is of the activated sludge type and was designed for a dry weather flow of 150,000 gallons/day or a population figure of 2,500 people at 60 gallons/capita/day. Primary treatment facilities can treat 260,000 gallons/day.

A screening chamber is provided in the influent works for removing floating rags, papers and other large solids, together with inorganic solids such as sand. The screening chamber is flushed out periodically to the sludge drying beds.

The primary settling tank is 24' - 0" in diameter, having a volume of 18,400 gallons and giving a retention period of 2.94 hours. The raw sludge, made up of organic settleable solids, is drawn off to the primary digester.

The tank has a cross-sectional area of 452 square feet and there are 88 lineal feet of overflow weir giving an overflow rate of 332 gallons/square ~~foot~~ of tank/day or 1700 gallons/lineal foot of overflow weir/day.

The volume of the aeration tank is 55,800 gallons, giving a 7.15 hour retention at design flow when it is assumed that 25% sludge is returned. The tank is equipped with a 6'-0" diameter high intensity aerating cone driven by a self-contained motor and drive unit.

Final settling is provided in a 28' -0" diameter, type "F" Simplex Settling Tank (Ames Crosta Mills) having a volume of 25,000 gallons which is equivalent to 3.2 hours retention at 125% of dry weather flow. The tank has a cross-sectional area of 616 square feet and weir length of 208 feet. This provides an overflow rate of 572 gallons/square foot/day or 720 gallons/lineal foot of overflow weir/day.

Activated sludge is returned to the aeration section by means of a 3" horizontal spindle pump.

The plant is equipped with two stage digestion having a combined capacity of 7170 cubic feet or a design

rating of 2.74 cubic feet/capita.

Sludge is drawn off from the secondary digester and run to the sludge drying beds. There are six drying beds, 20' x 30' giving a surface area of 3600 square feet or a design rating of 1.39 square feet/capita. The drying beds are underdrained with the filtrate running to the wet well of the # 5 lift station. The beds are manually cleaned and the dried sludge used as soil conditioner by the local residents and in the town's land reclamation program.

All of the equipment in the plant was supplied by the Ames Crosta Mills Company Limited of Heywood, Lancashire, England.

Effluent of the plant is chlorinated during the summer months as^{is} required by the Sanitary Engineering Division of the OWRC. Coniston Creek is the receiving stream.

PLANT OPERATION

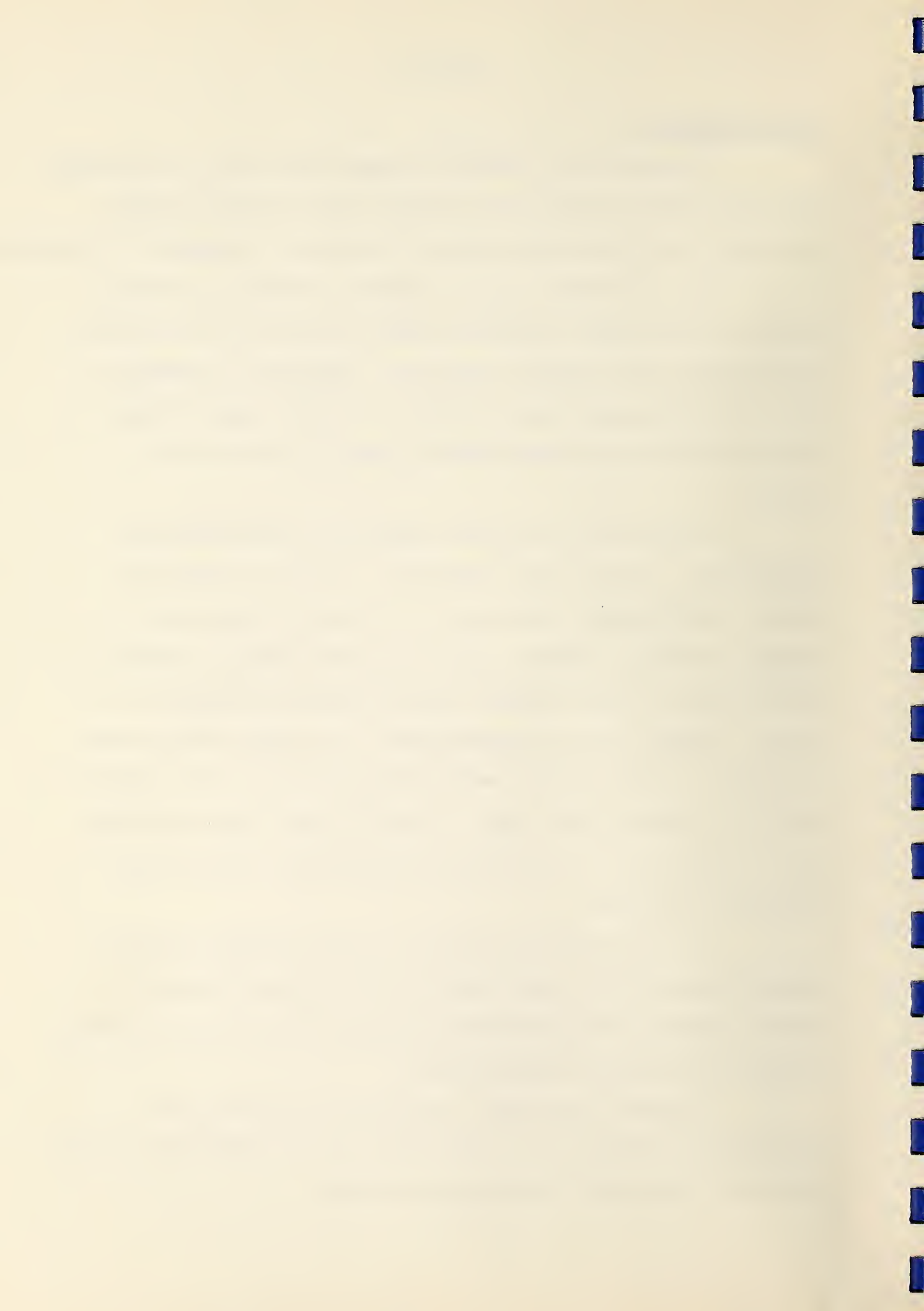
The plant was operated during 1962 by Mr. K. Glibbery. During the interval when Mr. Glibbery was attending courses in Toronto, the plant was attended to by Mr. J. Leonard of Coniston.

Mr. Glibbery's duties included operation and maintenance of the sewage treatment plant, along with twice daily inspections of the pumping stations. The plant is normally under 40 hours supervision a week, or 7 hours a day 5 days a week with $2\frac{1}{2}$ hours supervision on each of Saturday and Sunday.

During 1962, very few operational problems were experienced. Icing of the secondary clarifier occurred in January and February, while ice in the waste return line damaged an elbow. Foaming again presented a minor nuisance problem, until a foam control spray system was installed in August. Normal problems experienced with sludge drying beds during wet or cold weather were eliminated due to the acquisition of a tank and farm wagon. Liquid sludge hauled in this unit is being used by the Town in connection with the land reclamation program.

Mr. Glibbery carried out a twice monthly sampling program during 1962. Approximately 180 samples from the various stages of the treatment process and from the receiving stream were collected and analyzed.

The Town completed, during May, a manhole reconstruction program at an approximate cost of \$5,870.00. This amount was taken from the Reserve Account.



Pumping station alarm systems, to the Inco Police Station, were installed during August and September. These alarms will indicate a fault in the mechanical equipment in the pumping stations.

A stock of critical spare parts for the Ames-Crosta equipment was received in November and necessary replacements are presently being made.

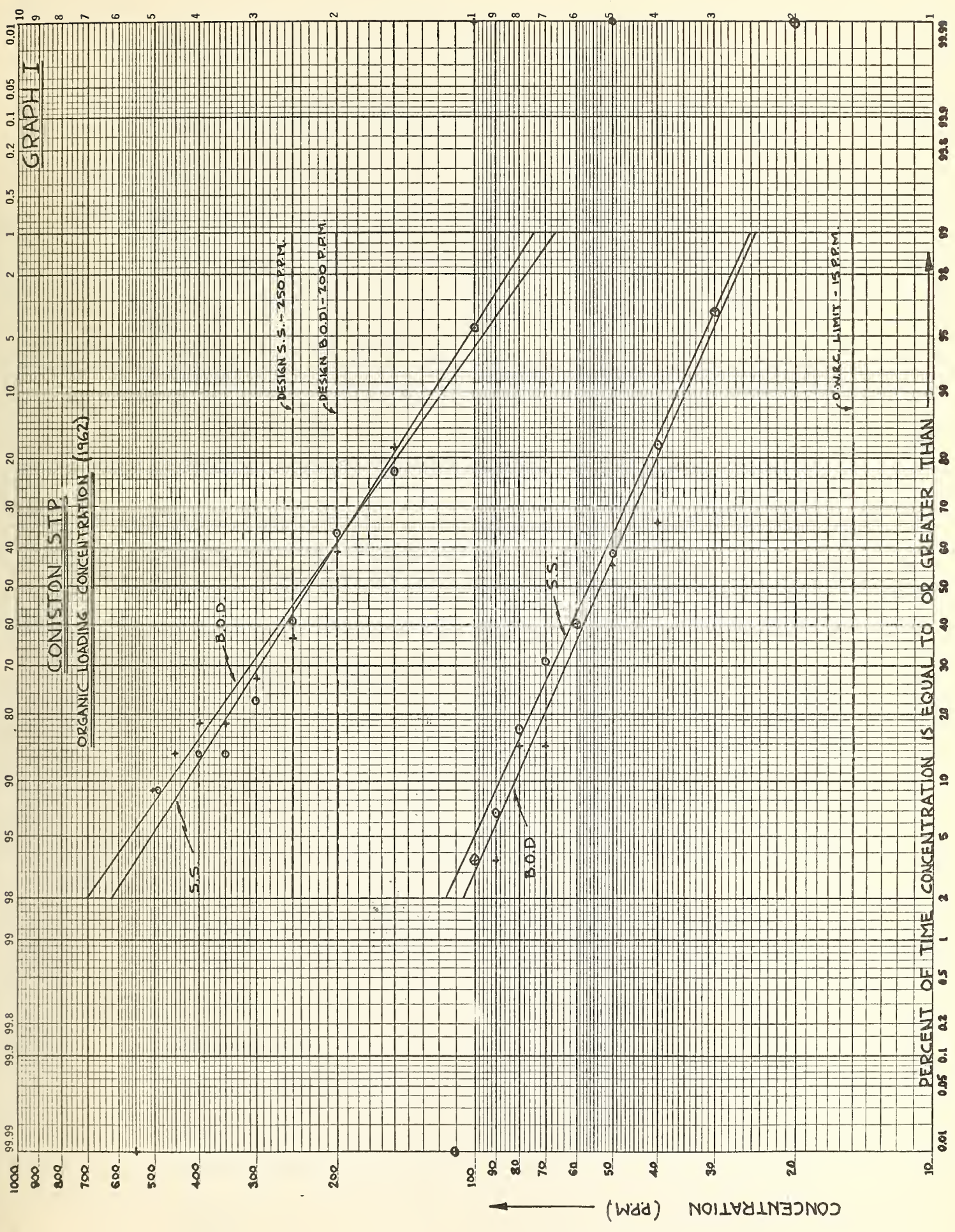
On October 25, Mr. Glibbery conducted a tour of the treatment plant for delegates to the Northeastern Ontario Water Works Convention. This convention was hosted by the Town of Coniston. During 1962, head office technicians visited Coniston a total of six times to assist the operator in various phases of his work such as process control, electronic and mechanical problems as well as comprehensive mechanical and electrical inspections.

PLANT PERFORMANCE DATA (1962)

MONTH	RAW INFLUENT		FINAL EFFLUENT		% REMOVAL	
	BOD (PPM)	S.S. (PPM)	BOD (PPM)	S.S. (PPM)	BOD	S.S.
Jan.	397	329	47	46	88.5	86
Feb.	205	227	67	59	67.5	74
Mar.	271	298	62	67	77	77.5
Apr.	168	183	70	82	58	55.5
May	130	183	59	61	55	67
June	230	470	35	44	85	90.5
July	250	239	32	43	87	82
Aug.	320	334	70	70	78.5	79.0
Sept.	520	984	34	37	93.5	96.5
Oct.	190	238	68	97	64.0	59.5
Nov.	315	240	36	38	88.5	84.0
Dec.	290	190	30	22	89.5	88.5
AVG:	274	326	51	55	81.8	83.1

OPERATING DATA

As can be seen from the Plant Performance Data, the plant is removing 81.8% of the 5-day BOD and 83.1% of the S.S. from the raw sewage. Graph I indicates that the plant is probably organically overloaded which may explain the relatively poor removal efficiencies. The actual organic loading cannot be calculated because of the lack of flow measurement but the organic concentration is such that 61% of the time the design BOD concentration is exceeded and 43% of the time the design S. S. concentration is exceeded.



COST DATA

The following information is a summary of the capital and operating cost data for 1962. Following this will be found a statement of the actual expenditures during 1962.

The total construction cost for this project OWRC # 57-S-8, as of December 31, 1961 was approximately \$468,635.00 which is broken down as follows :-

Sewer system and pumping stations	\$ 328,197.00
Treatment Plant	98,018.00
Engineering and Miscellaneous	30,746.00
	<hr/>
	\$ 456,961.00
Less (paid by Coniston for engineering fees)	13,800.00
	<hr/>
	\$443,161.00
Plus(capitalized interest during construction)	25,474.00
	<hr/>
TOTAL:	<hr/> <hr/> \$ 468,635.00

The cost of operating the Coniston Sewage Treatment Plant plus the five pumping stations was \$ 10,345.20 during 1962 and is broken down as follows :-

	\$	%
Payroll	4646.99	45.0
Fuel	567.58	5.5
Power	1071.82	10.4
Chemicals	608.00	5.9
General Supplies	861.02	8.2
Equipment	1236.56	12.0
Repair and Maintenance	222.01	2.0
Water	nil	nil
Sundry	1131.22	11.0

The total expenditure, during 1962, of \$10,345.20 exceeded the 1962 budget estimate of \$9,332.00 by \$1013.20. This overexpenditure during 1962 can be mainly attributed to two items. The first being that both Mr. Leclair and Mr. Glibbery were on staff during January, thus resulting in an additional charge of about \$400.00 on payroll for this month. The second item being the necessary purchase of about \$600.00 worth of new and replacement equipment. Neither of these items were considered when the 1962 budget was set.

Per Capita Cost - 2700 Persons

a) Capital Cost

- collection system	\$ 133.63
- treatment facilities	\$ 39.93
	<hr/>
<u>TOTAL:</u>	\$ 173.56

b) Annual Cost (1962)

- operating cost	\$ 3.83
- debt retirement, interest and reserve	\$ 17.67
	<hr/>
<u>TOTAL:</u>	\$ 21.50

BUDGET \$9,332.00

ACTUAL \$10,345.20

SUMMARY OF

PROJECT OPERATION STATEMENTS

OPERATING \$ %

BUDGET 9332.00 100

ACTUAL 10,345.20 111

OVER/ 1,013.20 11

YEAR 1962

PROJECT CONISTON 57-S-8

MONTH	EXPENDITURE		PAYROLL		CASUAL PAYROLL	FUEL		POWER		CHEMICAL		GENERAL SUPPLIES		EQUIPMENT	REPAIR & MAINT.		WATER	SUNDRY		
JAN.	1027	37	696	92		133	38	113	88			68	17					15	32	
FEB.	533	70	348	64				102	04			18	71					64	31	
MAR.	631	87	303	76		82	38	117	37			32	63			22		73	33	
APR.	1227	46	303	76		102	91	106	10		574	03	82					96	74	
MAY.	794	52	303	76		117	65	109	67		(160	58)	37	254	41			104	24	
JUNE	627	22	306	11				80	90		29	74	67					133	80	
JULY	725	05	328	98		5	67	72	73				41					219	26	
AUG.	613	56	467	28				65	33		(105	28)	36			23		79	46	
SEPT.	885	63	311	52		84	31	76	10		28	14	35			156		123	24	
OCT.	1236	35	311	52		11	64	64	67		404	95	04	268	62			26	91	
NOV.	591	30	311	52				85	05				27					118	46	
DEC.	1451	17	653	52		29	64	77	88		(163	00)	22	713	53	19	23	76	15	
TOTAL:	10345	20	4646	99		567	58	1071	82		608	00	02	1236	56	222	01		1131	22

RECOMMENDATIONS

1. A means of measuring the total plant flow is required in order that the load on the plant may be determined. This would be of considerable benefit in improving plant operation and in determining future requirements.
2. Some type of comminution should be installed in # 5 lift station to shred the material which presently is clogging and inhibiting the operation of pumps and aerators. Considerable savings in maintenance costs would be realized with the installation of such a unit.
3. At present, a large amount of scum, particularly grease, passes through the plant and is discharged in the effluent. A baffle installed in the effluent channel would collect this scum enabling much of it to be removed.
4. Modifications to the raw sludge pumping pits is recommended to provide more safe and convenient working conditions. Hinges should be installed on the cover plate and a light fixture located in the pit.

The cost to implement recommendations 1 and 2 will be relatively high and therefore has not been included in the operation budget. Recommendations 3 and 4, being relatively inexpensive, are included in the operating budget.

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